

General Notes

1. Petroleum Contractor shall furnish all items with the exception of the items "Furnished by MANA".

2. Contractor shall complete and furnish all documentation as required by the MANA representative at the time of the punch list inspection.

3. Operation is to be 24 hours, 7 days a week, attended in accordance with NFPA 30A, Chapter 4 & Chapter 9.

4. Interior E-stops at cashier positions are detailed on Building Electrical Plans, in addition to exterior E-stops shown on these plans.

5. MANA to provide the required labels & warnings detailed in NFPA 30A-3.2 & 4.9-5.5.

6. Contractor must use only manufacturer approved tools for installation of all piping & dispenser sumps. No use of hand saws, hand saws, Sawzall, utility knives, etc. will be allowed.

7. The Petroleum Contractor will furnish and install seal off fittings for the conduit at the canopy columns for connection by the General Contractor. The Petroleum Contractor will epoxy plug all seal off fittings as required in the electrical room, at the dispensers, and canopy columns.

8. Petroleum Contractor will receive all MANA supplied equipment & will be responsible for any damage not identified to MANA upon delivery. Petroleum Contractor to notify MANA Project Manager within 72 hours of receiving equipment.

9. The Petroleum Contractor will be contracted to complete all tank installation, petroleum underground piping, backfill, stone substrate, the grading & all electrical conduit rough in associated with the pump and tank within time period determined by the MANA Project Manager. Concrete pour (for the tank area, pump islands, and canopy areas), dispenser installation & wiring will be scheduled during project with MANA Project Manager.

10. The General Contractor will layout tank pad, canopy pad & faster locations, excavator form & pour footings for steel canopy, install canopy area laterals from canopy columns to storm sewer laterals, install hose bibs at canopy area.

11. All manhole openings on the tank slab shall be installed with a 2' x 18" run crown of concrete to prevent water intrusion into the manhole.

12. All curbing surrounding tank slab shall be poured monolithic in conjunction with tank slab.

Installation
All work to be coordinated with MANA Project Manager, General Contractor & Sub-contractors (including coordination of electrical conduit runs to the canopy & tank pads with the General Contractor).

All installation activities to be performed in strict accordance with PEI "Recommended Practices for Installation of Underground Liquid Storage Systems", PEUR/IO-05, PEI "Recommended Practices for Installations & Testing of Vapor Systems", PEI-RP300-04.

or most current PEI versions, manufactures installation manuals for all products, state & local code & the specifications & notes contained in these drawings.

Any discrepancy between these sources shall be identified & brought to attention of MANA's representative before activity is performed for resolution.

Contractor is responsible for all local permits. Contact MANA representative to verify that all required permits have been obtained. Contractor portions of registrations for state agencies shall be completed & given to MANA's representative upon completion.

Excavation
All excavation to be sized to provide minimum bedding clearance & depth of burials as shown. (54" minimum from finish grade to top of tank)

Contractor to adhere to all OSHA standards for excavations. All excavations greater than 4 feet in depth are to be shored in accordance with OSHA standard (29CFR 1926.650-692). Fall Protection to be provided around tank excavation at all times in accordance with applicable OSHA regulations.

Prior to backfill & tank installation, filter fabric shall be installed in accordance with applicable methods. Filter fabric is determined by site specific requirements & use shall be determined by MANA Project Dept.

Tanks
Tanks will be provided by MANA & delivered to the site by the manufacturer. Contractor is responsible for scheduling delivery via MANA representative, unloading & inspection of tanks. Any problems encountered should immediately be disclosed to the MANA representative & MANA Fuel Equipment Department before activity is performed for resolution.

All tank handling & installation is to be in strict accordance with manufacturer's "Installation Manual & Operating Guidelines". All checklists including shipping documents are to be completed & provided to MANA's representative. MANA requires the use of a crane for all tank handling activities.

Tanks shall be installed with zero slope, dead level, with fills towards curb side or as directed by MANA's representative. All manway bolts to be securely fastened prior to sump installation.

All brine levels to be adjusted to 7 1/2" after tanks have been secured with hold down water.

Tanks shall be installed, backfilled to top of tank & filled with water ballast the day they are delivered. Deviation from this process must be authorized by MANA's representative. Scheduling is imperative to meet the process.

Tanks shall be UL listed (UL-136) as called for on the site specific drawing & shall be fiberglass reinforced plastic (FRP) double wall tanks. Installation of tanks & piping shall be in accordance with the latest edition of the installation manual as provided by the manufacturer. Prior to testing, the general contractor shall verify manway bolt tightness. All bolts are set per manufacturer's torque settings & adjust as necessary.

Backfill

MANA recommends that all back fill is to be Pea Gravel, naturally rounded aggregate nominal 1/4" (1/8" min., 3/4" max.) in size. Pea Gravel is to be washed, free flowing, free of ice, snow and debris & conform to ASTM C-33 par. 4.1, size numbers 6 through 8 of Table 2.

When Pea Gravel is not readily available crushed stone may be used. The material is to be a mix of angular particles, sizes between 1/8" and 1/2", and no more than 5% (by weight) of the material may pass through a #8 sieve.

The Contractor will provide MANA's representative certification from the supplier that the material conforms to ASTM C-33 & any other applicable specification.

Disposal of Excavated Material
All excavated material is to be treated as clean back fill, removed & disposed by contractor.

MANA's representative must be notified immediately if any contaminated materials are encountered or suspected.

In the event contaminated material is encountered, such material is to be segregated by contractor & will be transported & disposed by third party.

Contractor will provide loading & credits given to MANA for transportation & disposal.

Excavation Dewatering
MANA will provide soils & groundwater data for site to determine if dewatering is necessary.

Contractor shall be responsible for installation of all dewatering equipment, if necessary, & shall furnish pumps with appropriate dewatering rates for use in & around the excavation to maintain as dry an excavation as possible.

In the event that these measures are not sufficient to control the dewatering, MANA's representative shall be notified & MANA shall secure third party services to assist in dewatering.

Contractor is responsible for continuous monitoring of ground water until facility is open.

Testing
Final precision testing of tanks, lines will be performed for MANA by third party. All other testing is to be performed by contractor & witnessed by MANA's on site representative.

All testing shall be performed in accordance with manufacturer instructions.

Contractor shall perform air test on tanks at time of delivery. Use 3 - 5 psi for a minimum of 60 minutes.

Primary piping to be air tested at 50 psi for a minimum of 60 minutes while scooping joints. (Do not exceed 60psi max)

Secondary testing to be performed at no more than 5 psi for a minimum of 60 minutes.

Air testing must remain in place on all piping (primary & secondary), with appropriate gauges until dispensers are set in place. Gauge reading needs to be documented that air test is good prior to dispenser set process. Upon completion of dispenser set process, an additional air test must be performed again on all piping until product is delivered & purge process begins.

All sumps, including tank spill bucket and dispenser to be hydrostatically tested in accordance with Federal, state & local regulations. At a minimum all sumps should be tested with water to a level 6" above highest joint or penetration for a minimum of 8 hours and verified liquid tight by the installing contractor. Initial & ending water level measurements to be observed by a MANA representative. Failure to perform this test will result in a retest & subsequent repairs at contractor's expense.

All tests shall be recorded and given to MANA's representative and included in the closeout documentation.

Hold Down Product
Water is to be used as hold down. Water is to be clean, free of debris & particles.

Contractor is responsible for securing and disposing of water. Tanks are to be filled to min. 90% capacity.

Prior to removing water contractor is to provide 72-hour notice to MANA's representative. MANA will make arrangements for delivery of product to replace water. All measurable levels of water shall be removed prior to replacing with gasoline. Verification of water removal shall be given to MANA's representative.

Water should remain in tanks until all petroleum work is completed & tank mat is installed.

Conduit Requirements
See E-1 to E-5. Verify with building/civil drawings by owner. NOTE: Conduits to be stubbed to edge of canopy & tank pads by general contractor; Petroleum Contractor is responsible balance.

(1) 1" GRC to each canopy column for space.

(1) 1" GRC to each canopy column for lights (column furthest from store).

(1) 1" GRC to each canopy column for power.

(1) 1" GRC to each dispenser (Sump sensor).

(1) 1" GRC to each interstitial reservoir. (Sump sensor)

(2) 1" GRC to each STP tank containment unit. (Sump sensor)

(1) 1" GRC to vent stack for overfill alarm & pressure device power.

Anchoring

All tanks are to be anchored as shown on drawings. Deadmen may be field constructed or prefab as available from tank manufacturer.

Contractor to use reinforced precast concrete deadmen, length typically equal to the length of the tank, with anchor bolts to correspond with straps.

All tank straps must be provided by tank manufacturer & installed in strict accordance with manufacturer instructions & spaced as directed.

Connect anchor to straps with 3/4" forged steel turnbuckles. All exposed turnbuckles & anchor bolts must be wrapped & coated with Filchmastic & protected with 18 lb. anodes per tank side.

Wire rope may not be used.

Piping
Product piping is to be 2" dia. APT XP Series in ducting. All runs are to be continuous, all joints are to be made in dispenser containment units & tank sumps only. A separate ball valve is required for each piping run. Piping connections to submersible pump to be 2" galvanized or approved stainless steel flex line.

All entry boots & fittings are to be APT product only. Risers & fitting to shear valves are to be UL listed stainless steel flexible connectors.

Pipe Testing
Testing of the secondary containment piping is required. The containment termination fitting in the sump is to be installed with the valve turned down. After testing the valve is to be opened to allow drainage of the secondary piping to the sump monitor probe.

Table with 4 columns: STEEL FITTINGS, DIMENSIONS, MATERIAL, THREAD. Rows include Steel Pipe Nipples Class 150/PN 20 and Schedule 40.

In the event that these measures are not sufficient to control the dewatering, MANA's representative shall be notified & MANA shall secure third party services to assist in dewatering.

Contractor is responsible for continuous monitoring of ground water until facility is open.

U.S. Conduit
All U.S. conduit shall be rigid galvanized steel. Conduit minimum bury depth is 24" per code. All junction boxes shall be class II, DIV 2 rated. All electrical conduit in sump shall include a seal-off entering & leaving, which shall be installed 6" min. above highest penetration in sump. Dispenser conduits to be installed through metal sump top conduit knockouts.

Sump Penetrations
All penetrations of the tank sumps shall be sealed with double bulkhead fittings & not to exceed 15% angle in any direction to ensure the proper installation of all bulkhead compression fittings & resultant of water tightness.

Dispenser Installation
Contractor shall install all dispensers in accordance with most current manufacturer installation practices. Strict adherence to installation guidelines should be followed at all times.

Dispenser DATA communication wiring shall be installed in separate conduit & shall be twisted pair, minimum 18 gauge, color coded for data & GRIND wiring. ISO rated 600 volts, oil & gas resistant. Wiring shall be home run from dispenser to universal distribution box (D-Box) with no splicing. (See chart below)

The dispenser communication DATA/FUEL loop shall be wired in a manner that will allow for dispensers to be split equally on each distribution board in the Fuel Loop D-Box.

The dispenser communication GRIND loop shall be wired in a manner that will allow for dispensers to be on one (1) distribution board in the GRIND loop D-Box.

Dispenser power wiring shall be run in separate conduit & shall be 12 AWG with home runs from the dispenser to the breaker panel or isolation relay. Two (2) separate wires of different color to be run also, terminating in a 4" braid in electrical room.

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Dispenser power wiring shall be run in separate conduit & shall be 12 AWG with home runs from the dispenser to the breaker panel or isolation relay. Two (2) separate wires of different color to be run also, terminating in a 4" braid in electrical room.

Table with 4 columns: NO., COLOR, MIN. AWG, USE. Lists wire colors and their applications like BLACK 12 HOT TO 2, WHITE 12 NEUTRAL A-13, GREEN 12 GROUND TO 2, RED 12 TO PREMIUM STP.

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Conduit Requirements
See E-1 to E-5. Verify with building/civil drawings by owner. NOTE: Conduits to be stubbed to edge of canopy & tank pads by general contractor; Petroleum Contractor is responsible balance.

(1) 1" GRC to each canopy column for space.

(1) 1" GRC to each canopy column for lights (column furthest from store).

(1) 1" GRC to each canopy column for power.

(1) 1" GRC to each dispenser (Sump sensor).

(1) 1" GRC to each interstitial reservoir. (Sump sensor)

(2) 1" GRC to each STP tank containment unit. (Sump sensor)

(1) 1" GRC to vent stack for overfill alarm & pressure device power.

Incon Tank Gauge Installation

All Automatic Tank Gauge (ATG) installation & wiring to be performed in full accordance manufacturer's installation manual. Contractor & electrical contractor performing ATG installation must have manufacturer installation certification. All probe and sensor wiring splices shall use manufacturer supplied splice kits & contained in a Glass I electrical junction box.

All probe and sensor wiring must be 18AWG min shielded Belden cable or equivalent.

Specific attention must be given to Manufacturer grounding requirements (12 AWG conductor, buried ground to earth ground (use of power distribution panel).

Installation includes Overfill Alarm and acknowledgement switch on vent riser. Overfill must be wired to Relay Output 1 located in the Power Supply Module.

Positive shut down of submersible controllers must be wired via the automatic tank gauge (ATG) Turbine Pump Interface (TPI) port. It is the petroleum installation contractor's responsibility to run appropriate data cabling to properly shut off all STPs in an individual manner as controlled by the ATG. Except for the Unleaded STPs, each STP should have a home run wiring from the specified STP controller isolation relay box (STP-DH) to the appropriate STP controller (MAS). Unleaded STPs should have a home run wiring from the isolation relay box to the ATG's AC Input Module (Channel 1). Programming of the ATG will be the responsibility of the local programming/start up contractor.

Contractor to service the location. Coordination should be taken between the installation contractor and the programming / start up contractor to insure that proper wiring and programming corresponds to the requirements for positive shutdown process.

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Equipment Start-Up/Purging & Calibration

Contractor shall notify MANA representative 72 hours prior to equipment startup. Dispenser, tank monitor & submersible pump commissioning to be performed by service vendor as selected by MANA. Permanent electrical service to store must be installed prior to equipment startup. EVO to be operational upon gas entering the tanks.

Upon completion of equipment commissioning by service vendor, Contractor shall purge all dispensing equipment in accordance with manufacturer's standard practices. MANA requires a minimum of 150 gallons be purged from each meter after air is removed from product lines.

Purging of air from the product lines shall be accomplished using the product piping shear valve. Product shall be purged until no air is observed, a minimum of 50 gallons per shear valve. Initial purging of air shall NOT be done using the nozzle. Severe damage may occur to dispensing equipment. If damage occurs, Contractor is responsible for all repairs. Refer to manufacturer's instructions for proper purging procedures. Failure to purge from the shear valve will result in forfeiture of final payment.

Petroleum Contractor shall return to the site to purge & calibrate pumps, & shall return to the site for start up by a third party, as scheduled by the MANA Project Manager.

Petroleum Contractor to be onsite during all third party testing activities.

The brine level in the tanks shall be verified & adjusted to 6-5" at greater than one tank capacity prior to store opening.

MANA Petroleum Closeout Documentation Needed
The following items are required at the time of completion of all gasoline installation contractors:

1. Tank Installation Checklist (Associated delivery bill of lading).

2. Product Piping Warranty Sheet, completed and signed.

3. Tank Registration Application of Permit (if applicable). Please forward to the Pennsylvania Department of Environmental Protection (PA DEP).

4. Flammable Liquid Permit (if applicable). Let in PA, must have signature of Fire Inspector.

5. Tank and Line Test Results (from Crumpco) Height & Measure Notification (written) & completed registration forms.

7. Emergency Registration Form (Provided by Start-up Contractor)

8. Silencing Commissioning Checklist (Provided by Start-up Contractor)

4. Pictures of the entire installation process (tanks, piping and completed fuel court)

10. As-built drawings for underground tanks, piping, conduits, and any utilities.

11. Pea gravel certification of ASTM C-33 from store supplier.

Two (2) of each of these items need to be delivered by the petroleum contractor at the time of the gasoline punch list walk. Failure to provide the proper documentation will delay and/or forfeit final payment.

Table with 2 columns: PART NUMBER, DESCRIPTION. Lists various materials like DISPENSERS, TANKS, and SUBMERSIBLE PUMPS.

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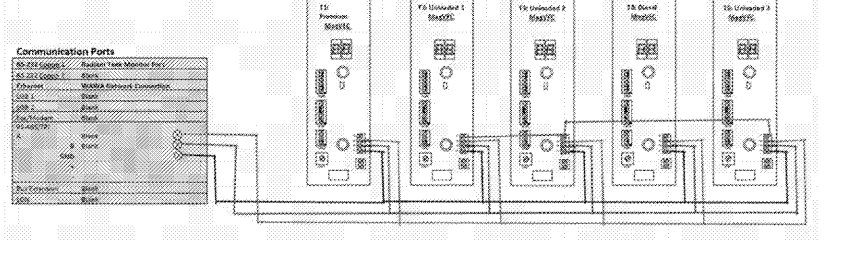


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Wawa logo and GASOLINE DETAILS PENNSYLVANIA / VIRGINIA GENERAL NOTES & LEGEND (22,000 COMPARTMENTALIZED TANKS). Includes scale, date, drawn by, checked by, and drawing number.